

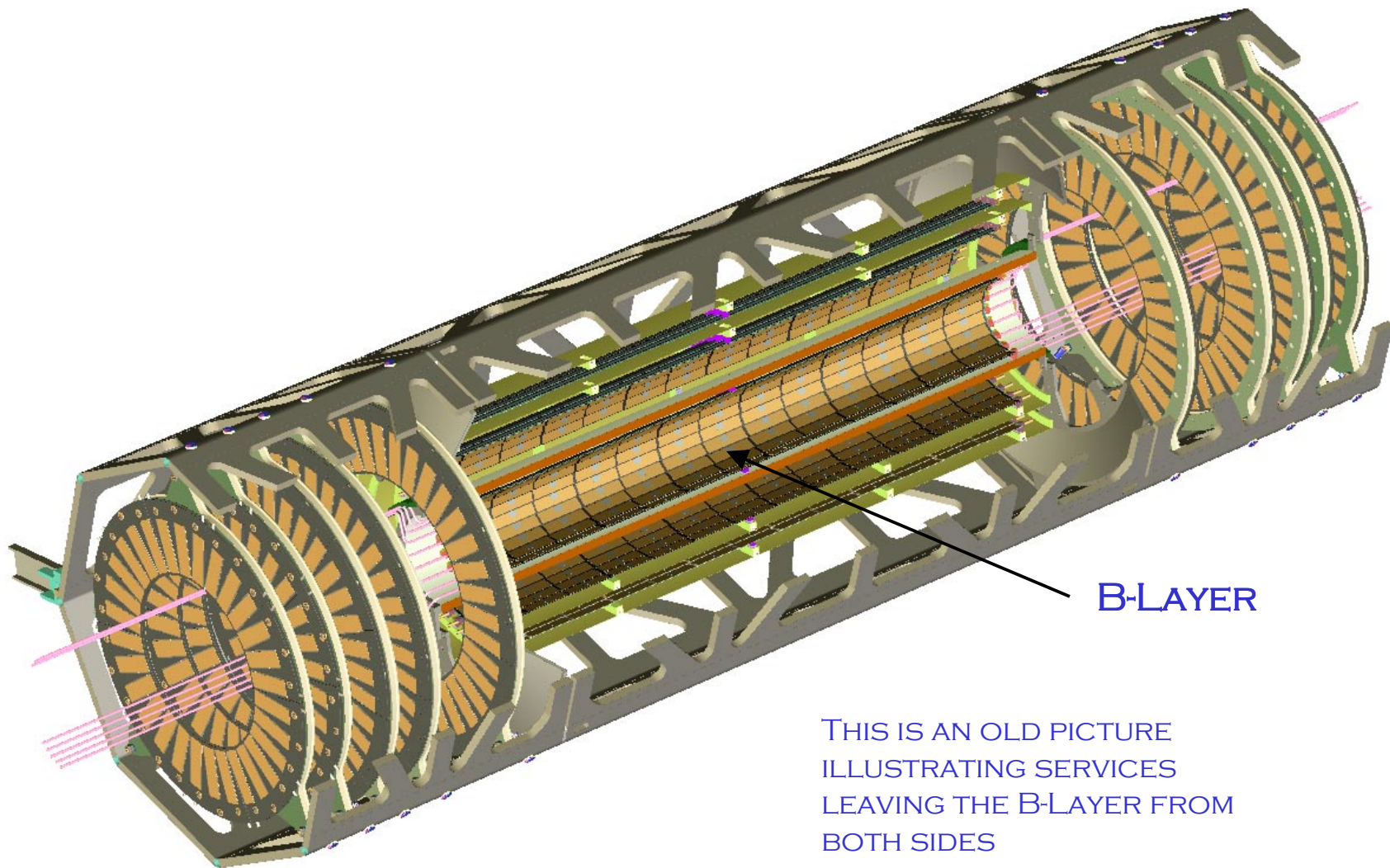
B-LAYER INSTALLATION

16-MAY, 2000

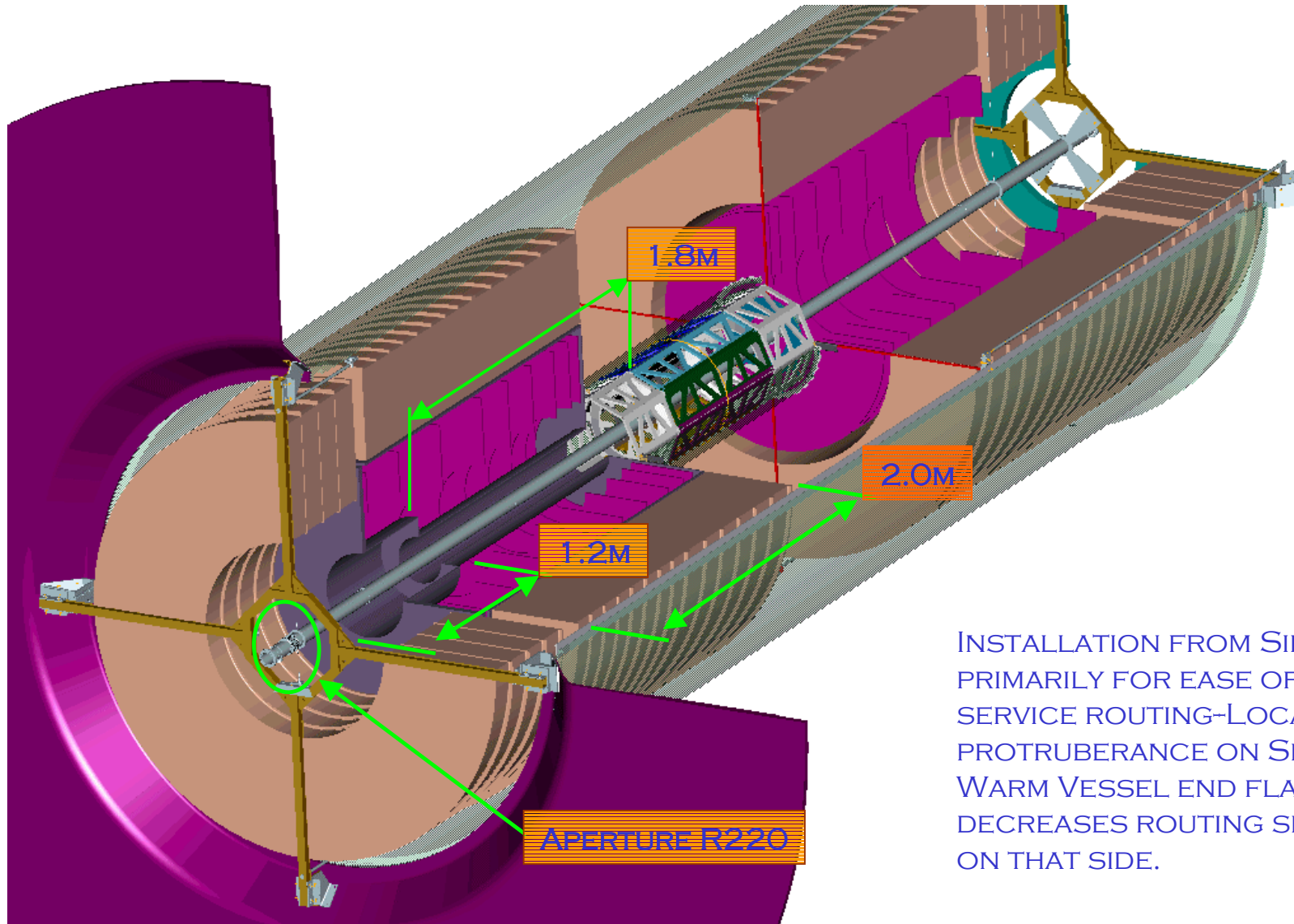
ATLAS BEAM PIPE REVIEW

E. ANDERSSSEN, LBNL

LAYOUT OF DETECTING STRUCTURES

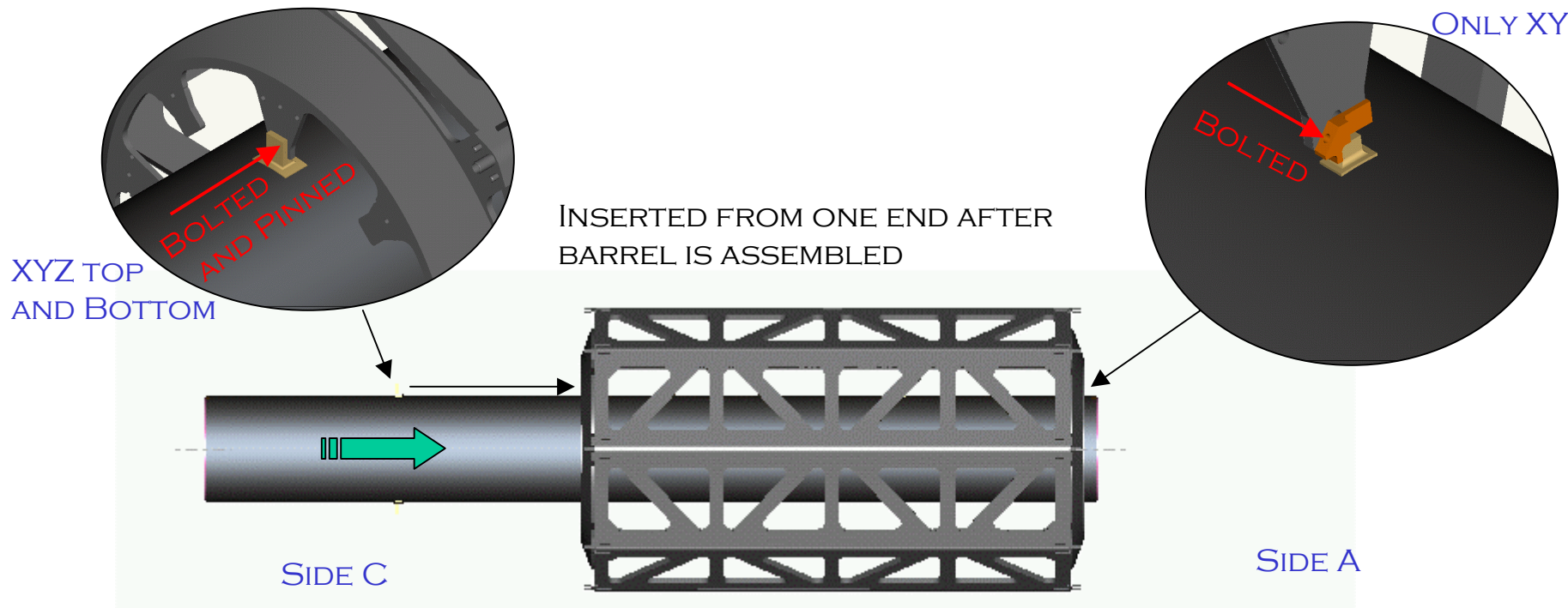


LAYOUT OF C-SIDE OF INNER TRACKER



INSTALLATION FROM SIDE C
PRIMARILY FOR EASE OF
SERVICE ROUTING-LOCAL
PROTRUBERANCE ON SIDE A
WARM VESSEL END FLANGE
DECREASES ROUTING SPACE
ON THAT SIDE.

THERMAL BARRIER IS B-LAYER SUPPORT



- **THERMAL BARRIER IS RIGIDLY MOUNTED TO BOTH END CONES**
- **STILL DIRECTLY MOUNTED TO END PLATE STIFFENERS, HOWEVER LOCATION IS FROM SUPPORT CONE (NEED TO WORK ON COMPLIANT MOUNT SCHEME)**
- **THERMAL EXPANSION ON ORDER OF ASSEMBLY/BUILD TOLERANCES**

CONSTRAINTS AND REQUIREMENTS

- **WORK-SPACE LIMITATIONS**

- ACCESS PORT IS .87 X 1.5 METERS
- AVAILABLE LENGTH IS ~3 METERS-CONSISTENT WITH “SHORT OPENING”, NEED MINIMUM OF 2M
- ALL TOOLING MUST BE HAND CARRIED

- **INTERNAL LIMITATIONS**

- BEAM PIPE SUPPORT AT 2750 MUST BE REMOVED
- ALIGNMENT PATHS IN SCT FORWARD CRUNCH IN ON THE OUTSIDE RADIUS

- **THERMAL BARRIERS**

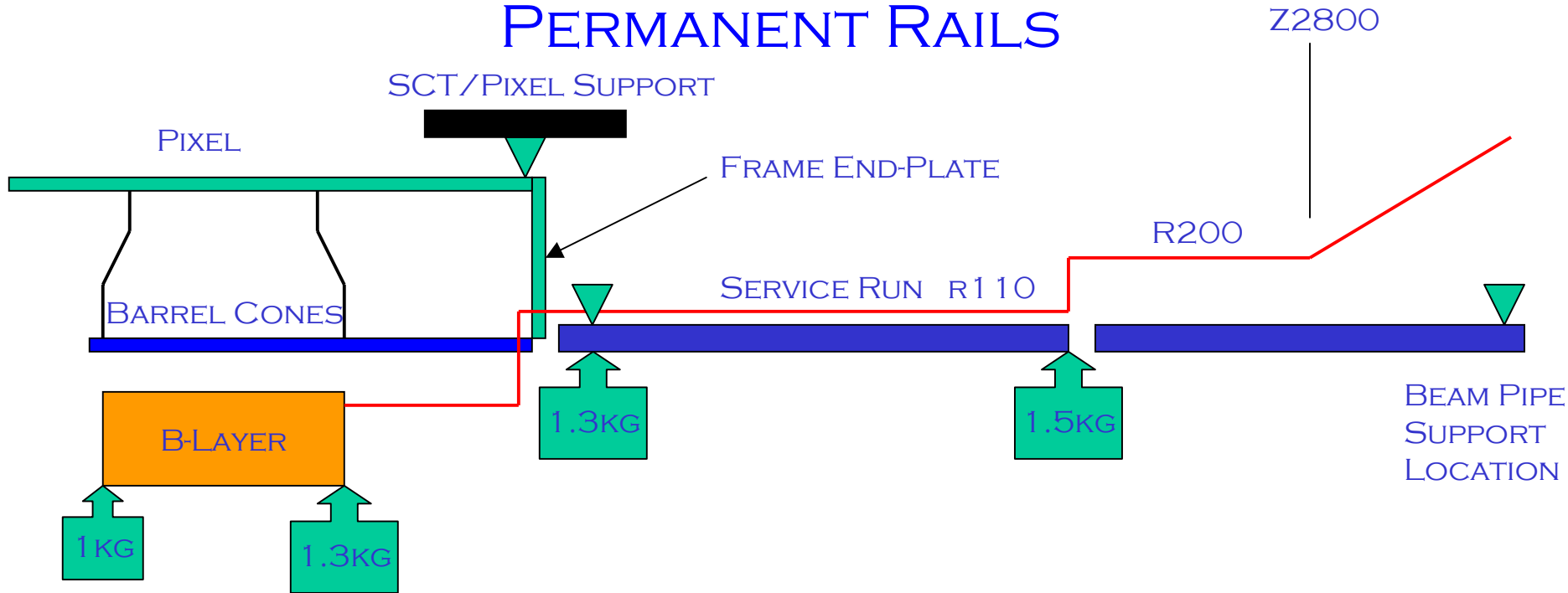
- 13 DEG C DEWPOINT CAVERN AIR
- WARM-UP SCENARIOS

- **TIME**

- SHORT OPENING SCHEDULE

- **COMMON TOOLING WITH BAKE-OUT JACKET-NO LONGER AN ISSUE**

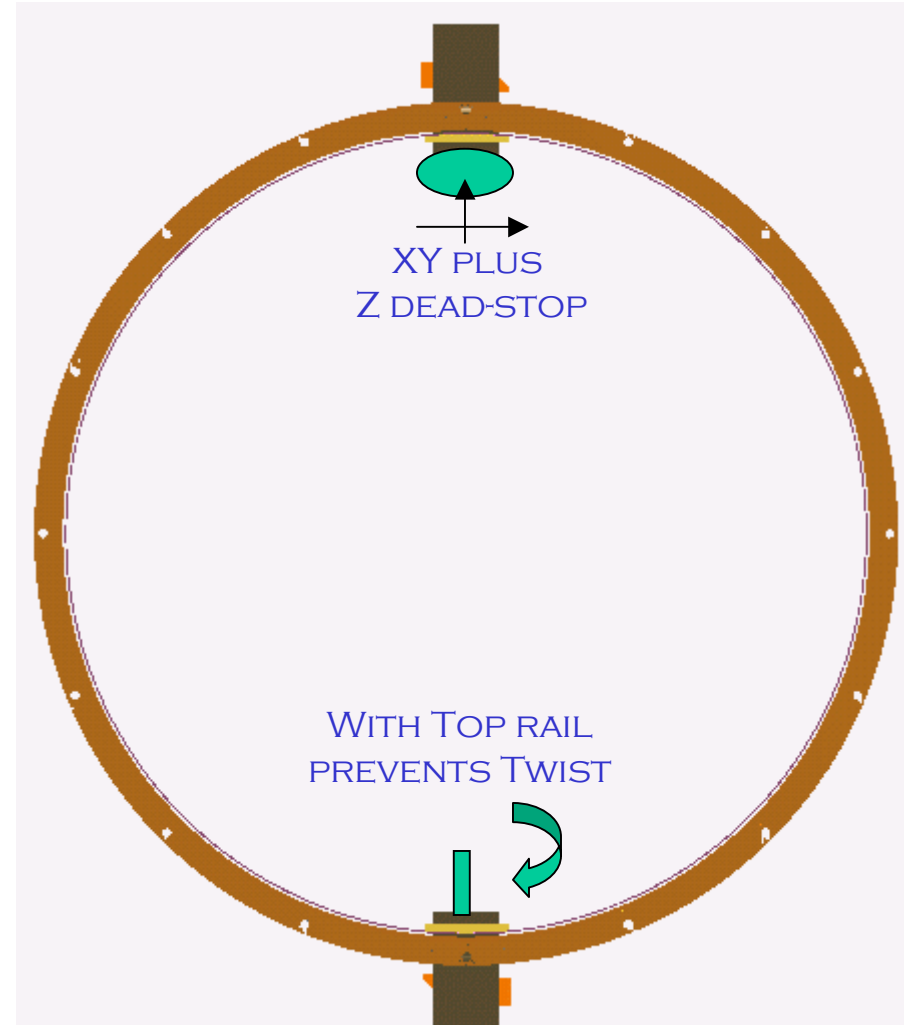
PERMANENT RAILS



- **TRY TO INTEGRATE B-LAYER INSTALLATION WITH B-LAYER SUPPORT**
 - PROPOSE TO MOUNT RAIL DIRECTLY TO BARREL SUPPORT CONES AND POSSIBLY FRAME END STIFFENER
- **SERVICES OUT ONE SIDE ONLY**
- **RAIL IN SCT FORWARD-ALSO PERMANENT**
 - SUPPORT OF SERVICES OFF OF SCT FORWARD THERMAL BARRIER (VIA RAIL)

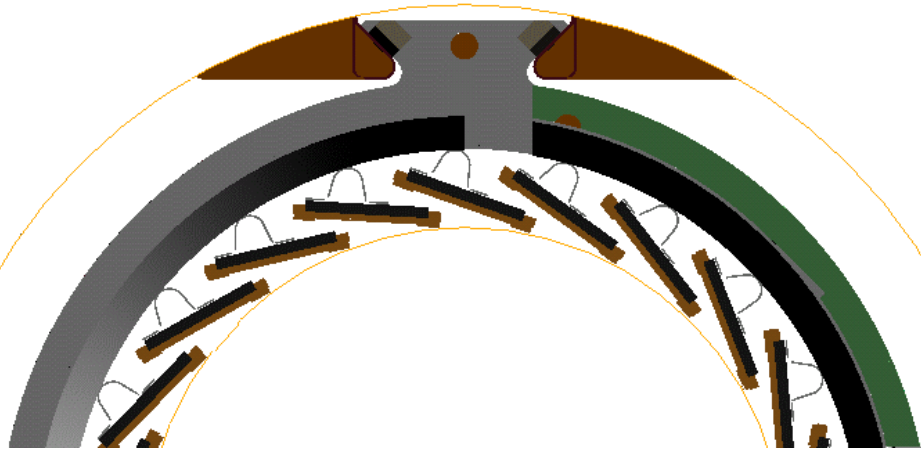
THERMAL BARRIER TO PIXEL INTERFACE

- **INSERTED FROM SIDE C**
- **TOP PENETRATIONS SUPPORT RAIL, BOTTOM SUPPORT FIN**
- **RAIL DEFINES POSITION IN XYZ (OR R, Z) (OF B-LAYER)**
- **RAIL + FIN DEFINE PHI**
- **Z, R, PHI FROM CONE SIDE C**
 - PINNED AND BOLTED TOP AND BOTTOM
- **CONE SIDE B DEFINES RADIUS AND ALIGNS WITH Z AXIS.**
 - REGISTRATION SHOULDER AND BOLT TOP
 - BOLTED FLAT (IN R) BOTTOM
- **RAIL GEOMETRY IS USED AS INTERFACE ALSO IN FORWARD AND TOOLING**



PIXEL DETECTOR

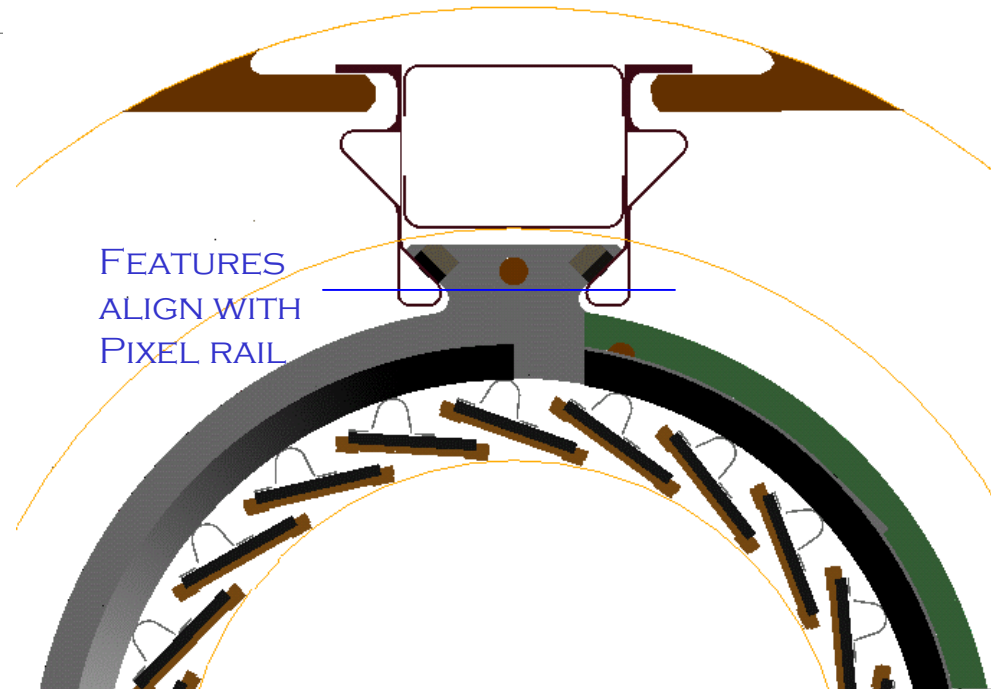
RAIL GEOMETRIES



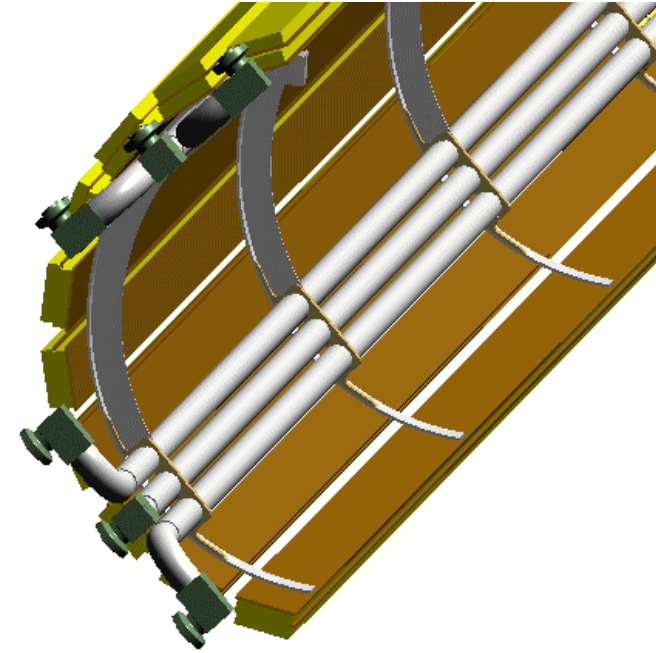
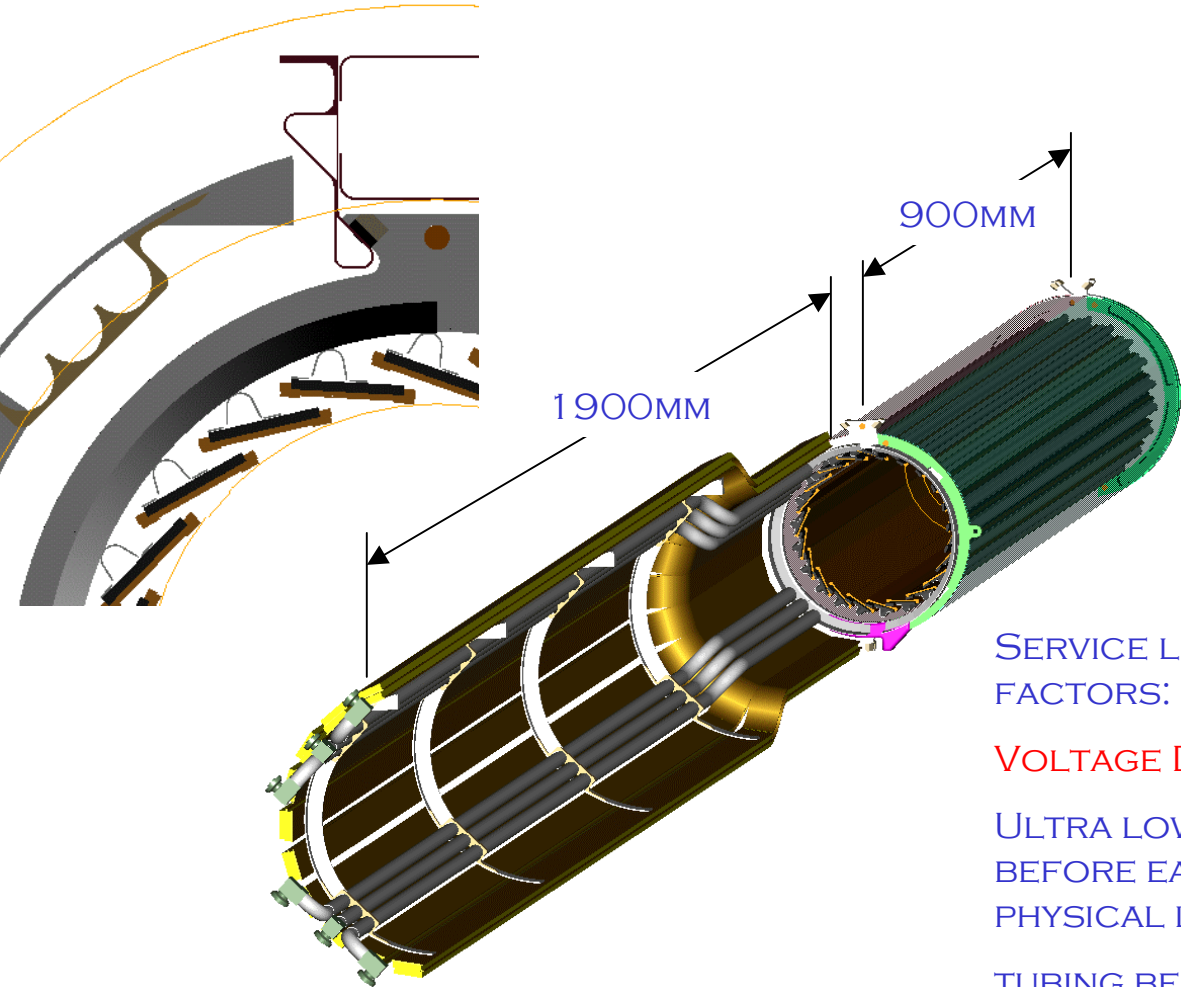
DOVETAIL RAIL ON B-LAYER FORMS A COMMON INTERFACE TO ALL OF THE TOOLING, AND ALLOWS A NEARLY KINEMATIC SUPPORT AT ALL TIMES.

FINAL POSITION OF B-LAYER IS DETERMINED BY PINS AND STOPS

SCT FORWARD RAIL "FLOATS" TO ALLOW MISMATCH BETWEEN BARREL AND FORWARD OF UP TO 2MM-PINS REGISTER IT TO THE RAIL IN PIXEL VOLUME



PIXEL DETECTOR SERVICE SUPPORTS



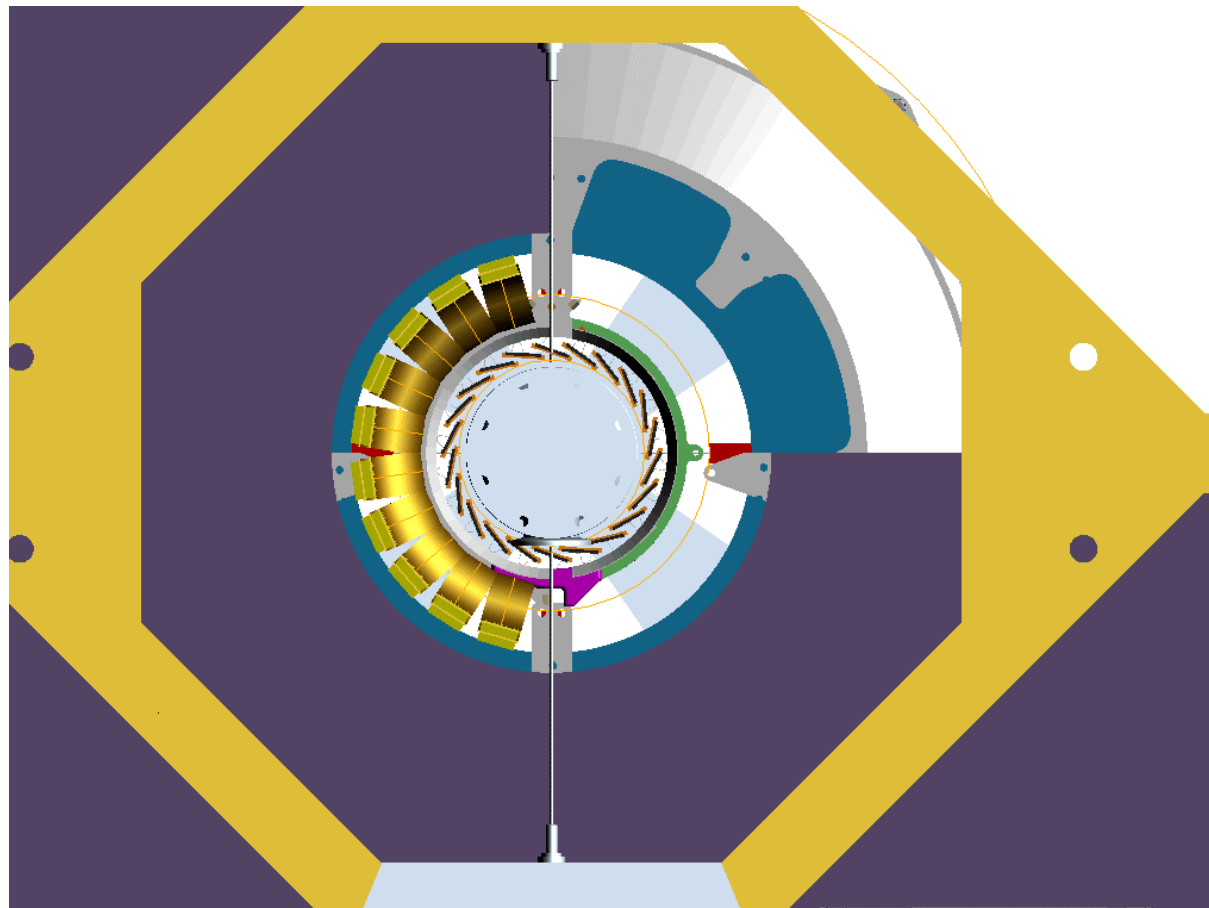
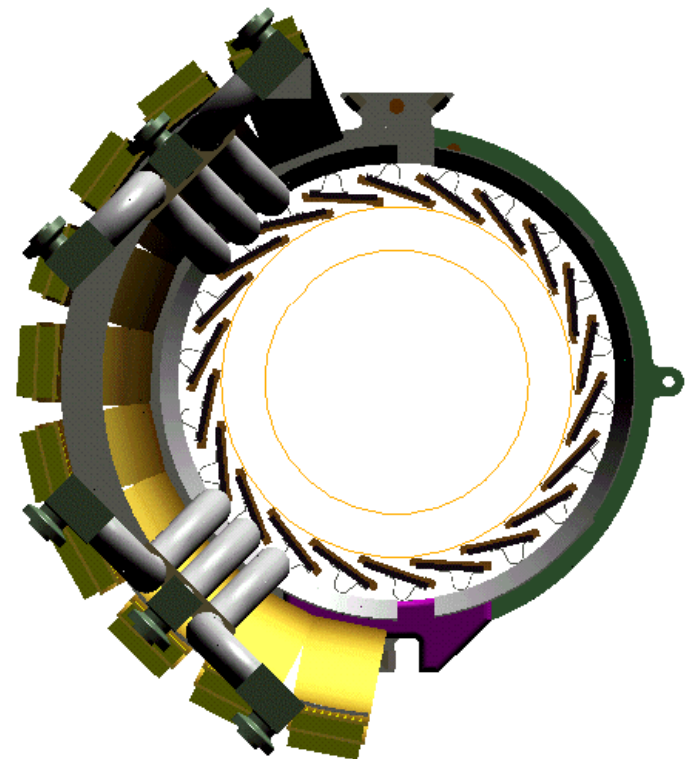
SERVICE LENGTHS ARE DETERMINED BY TWO FACTORS:

VOLTAGE DROP AND TUBING BENDS

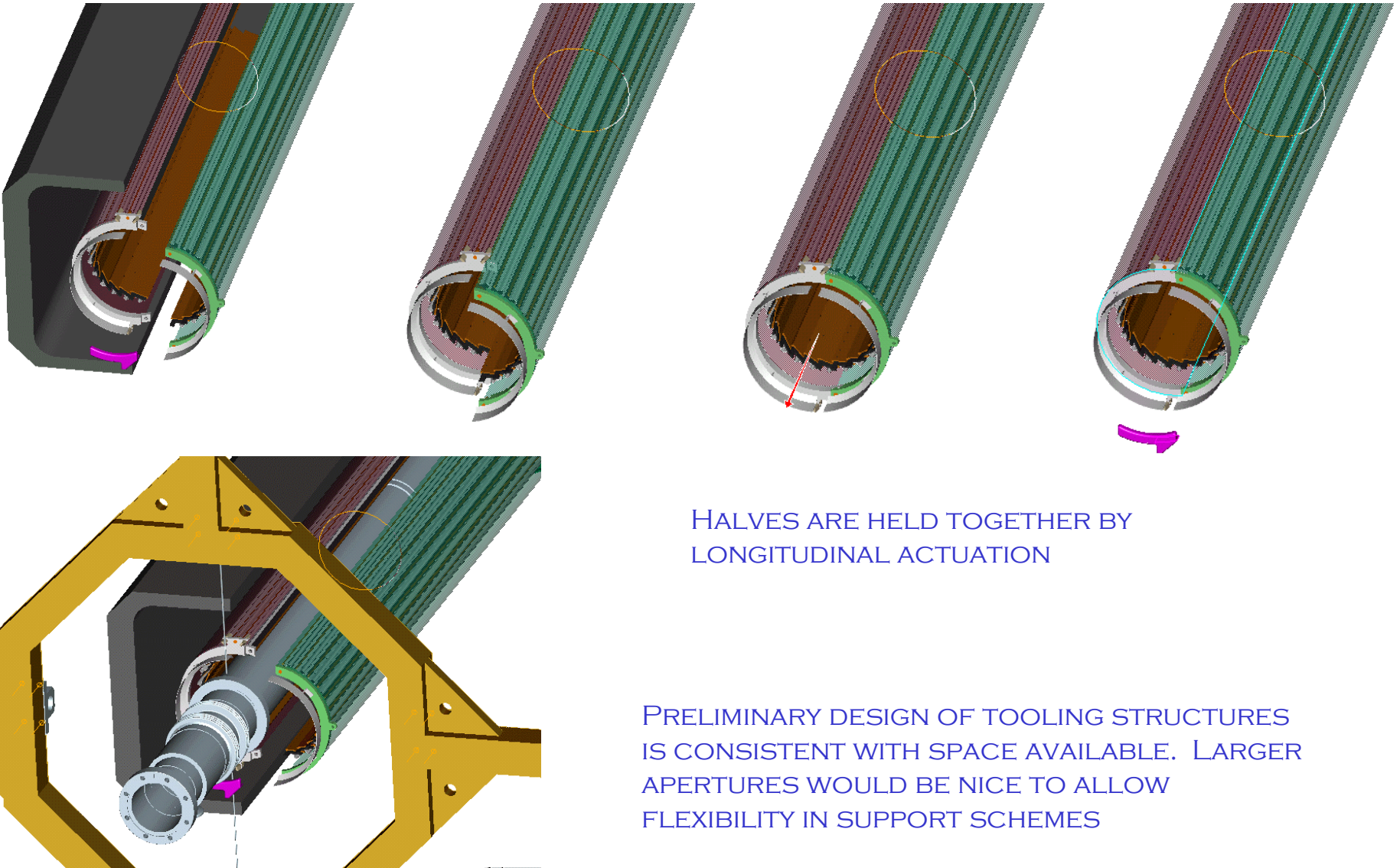
ULTRA LOW MASS CABLES CAN ONLY GO SO FAR BEFORE EATING VOLTAGE DROP BUDGET, AND PHYSICAL LIMIT ON FINE PITCH FLEX.

TUBING BENDS REPRESENT A CHANGE IN INTERFERENCE ENVELOPE AND OFTEN NECESSITATE A BREAK.

PIXEL DETECTOR END VIEWS



PIXEL DETECTOR ASSEMBLY CONCEPT

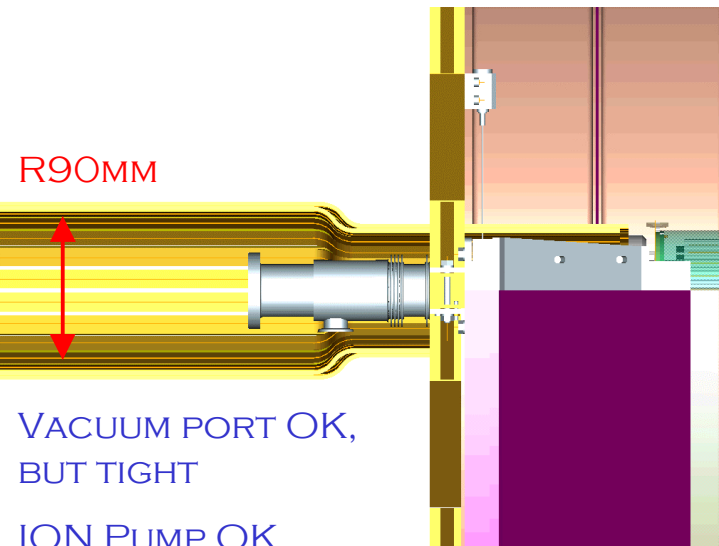
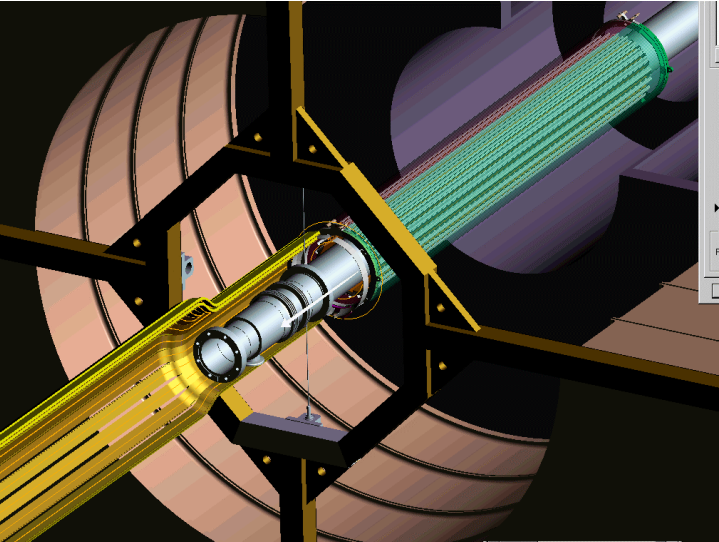


HALVES ARE HELD TOGETHER BY
LONGITUDINAL ACTUATION

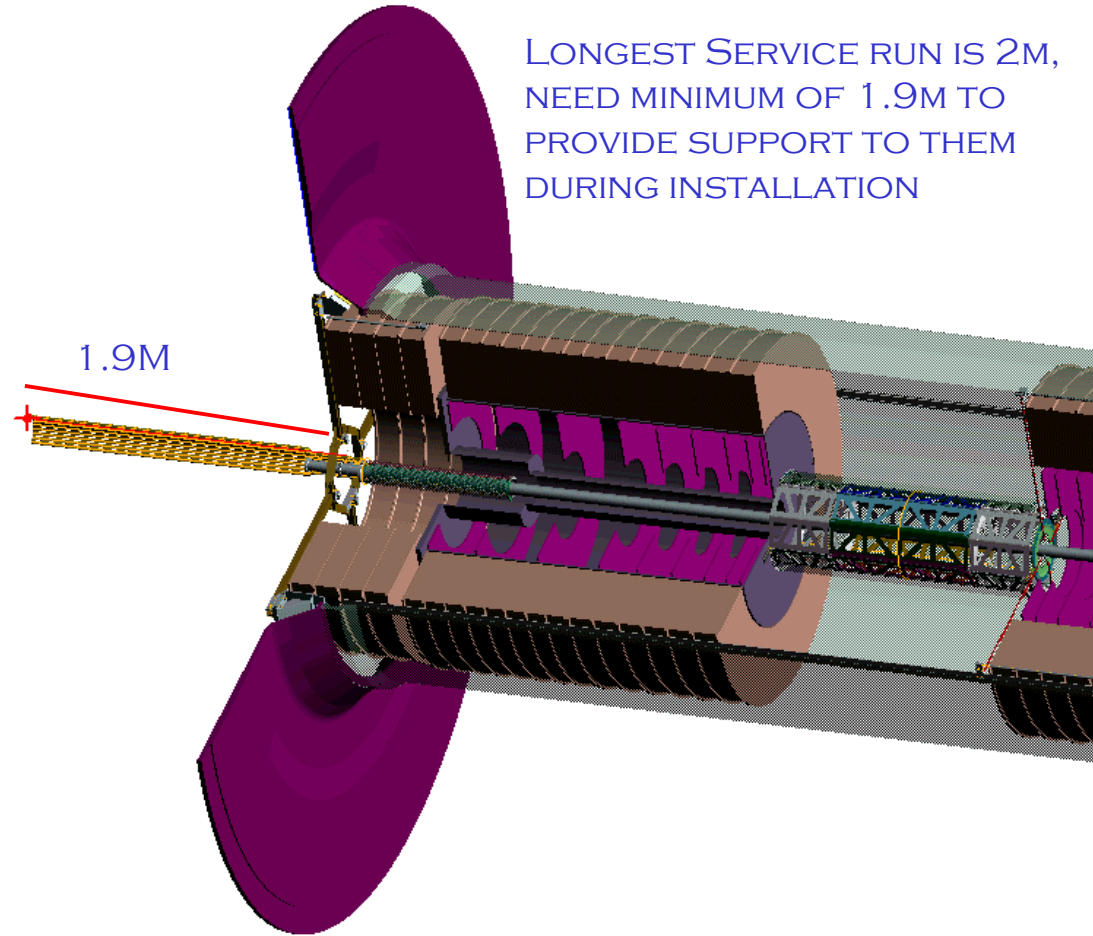
PRELIMINARY DESIGN OF TOOLING STRUCTURES
IS CONSISTENT WITH SPACE AVAILABLE. LARGER
APERTURES WOULD BE NICE TO ALLOW
FLEXIBILITY IN SUPPORT SCHEMES

PIXEL DETECTOR

INSERTION OF B-LAYER

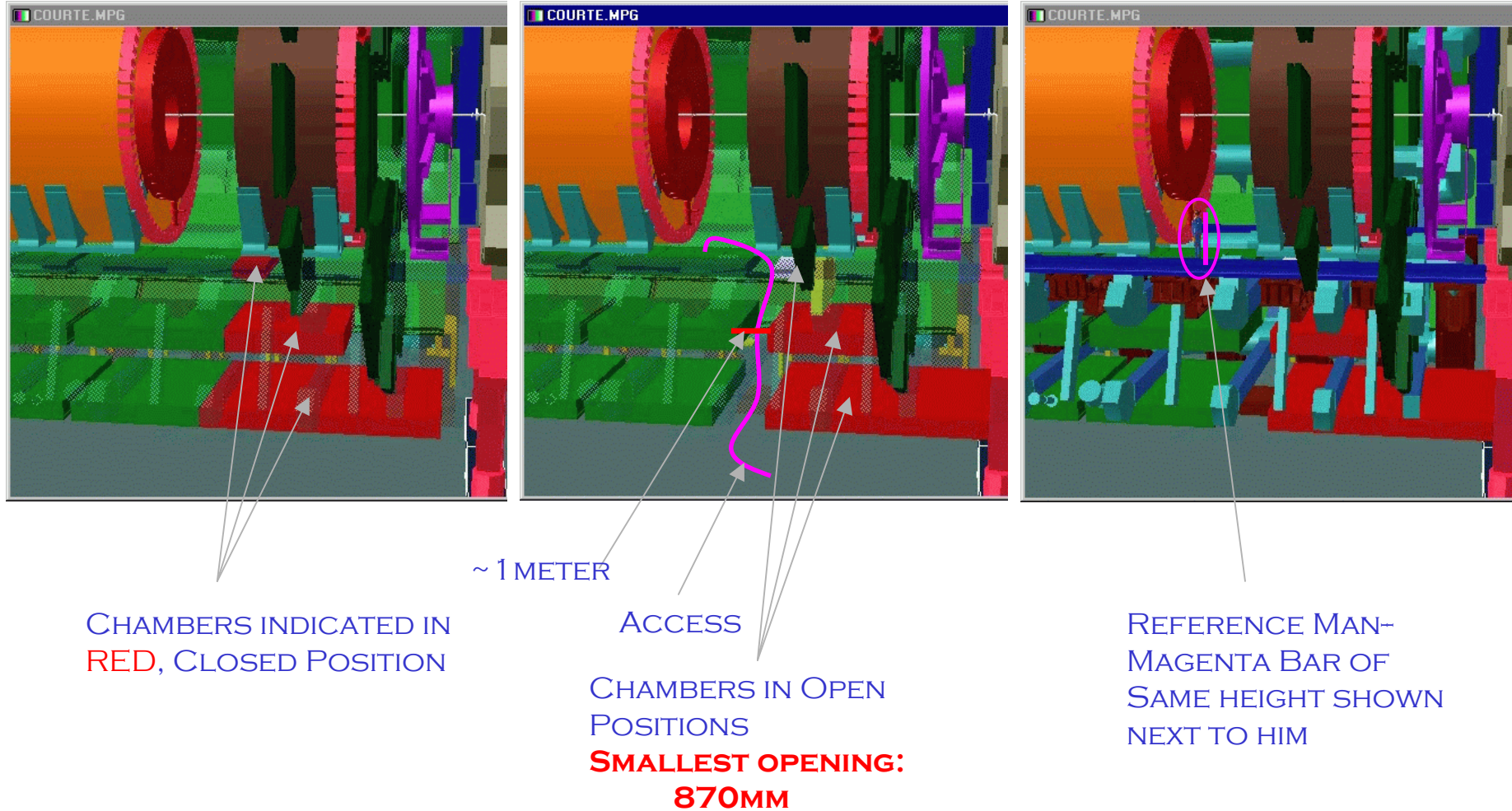


MAY 2000
BEAM PIPE REVIEW



LONGEST SERVICE RUN IS 2M,
NEED MINIMUM OF 1.9M TO
PROVIDE SUPPORT TO THEM
DURING INSTALLATION

ACCESS TO B-LAYER



PIXEL DETECTOR

CONCLUSIONS

- **B-LAYER FITS, BUT NEED TO FINISH DETAIL MODELING OF THERMAL BARRIER INTERFACES**
- **SERVICES ARE TIGHT, BUT SPACE SEEMS ADEQUATE**
- **SERVICES AT END OF BEAMPIPE, AND THROUGH TRANSITION NEED TO BE ADDRESSED**
- **SUPPORT METHODS FOR TOOLING NEED TO BE DEVELOPED**